Log Event A

Borehole # 40-05-07

Borehole Information

Farm : S	**Tank :** S-105	**Site Number :** 299-W23-155
N-Coord : 36,081	**W-Coord :** 75,783	**TOC Elevation :** 663.90
Water Level, ft :	**Date Drilled :** 10/31/1971	

Casing Record

Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 96	

Borehole Notes:
This borehole was drilled in October 1971 to a depth of 100 ft and completed with 6-in.-diameter casing. The borehole was not perforated or grouted. The casing wall thickness is assumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel casing.

The zero reference for the SGLS logs is the top of the casing. The casing lip is approximately even with the ground surface.

Equipment Information

Logging System : 2	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 05/1996	**Calibration Reference :** GJPO-HAN-5	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number : 1	**Log Run Date :** 06/13/1996	**Logging Engineer:** Alan Pearson
Start Depth, ft.: 96.5	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 39.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Log Run Number : 2	**Log Run Date :** 06/14/1996	**Logging Engineer:** Alan Pearson
Start Depth, ft.: 0.0	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 40.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

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Analysis Information

Analyst : H.D. Mac Lean

Data Processing Reference : P-GJPO-1787 Analysis Date : 03/19/1997

Analysis Notes :

This borehole was logged in two logging runs. A centralizer was used for each log run.

The pre- and post-survey field verification spectra for each log run met the acceptance criteria established for peak shape and system efficiency. The energy and peak-shape calibration from the post-survey field verification spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging runs. There was negligible gain drift during the logging runs and it was not necessary to adjust the established channel-to-energy parameters during processing of log data to maintain proper peak identification.

Casing correction factors for a 0.280-in.-thick casing were applied during the analysis.

A log overlap, where data were collected at overlapping points in the borehole by separate logging runs, occurred between depths of 39 and 40 ft. The calculated concentrations of the naturally occurring radionuclides using the separate data sets were within two standard deviations of the measurements (two-sigma or 95-percent confidence level), indicating acceptable repeatability of the measured spectral gamma-ray peaks used in the radionuclide calculations.

Cs-137 was the only man-made radionuclide detected in this borehole. Cs-137 contamination was detected at the ground surface and almost continuously between depths of 1 and 19.5 ft. Measured concentrations in this zone ranged from about 0.2 pCi/g to a maximum of about 1.4 pCi/g. This contaminant was also detected at a depth of 57 ft with a concentration of about 0.2 pCi/g. The maximum measured Cs-137 concentration was about 2 pCi/g at the ground surface; however, this value is only apparent and probably exceeds the true formation concentration because the configuration of the detector system does not conform to the configuration used in the calibration model.

The logs of the naturally occurring radionuclides show a slight decrease in the K-40 and Th-232 concentrations between depths of 41 and 43 ft. There is a slight increase in the U-238 concentrations between depths of 52 and 56 ft and a decrease from 57 to 62 ft. There is a slight decrease in the measured K-40 concentration between depths of 54 and 62 ft. Below 62 ft, the measured K-40 concentrations increase from a background of 12 to about 17 pCi/g. The measured U-238 and Th-232 background concentrations also increase perceptibly at the 62-ft depth.

The SGLS total count log plot reflects the varying concentrations of the naturally occurring radionuclides and the Cs-137 contamination in the upper portion of the borehole.

Details concerning the interpretation of data for this borehole are presented in the Tank Summary Data Report for tank S-105.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The naturally occurring radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma-

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ays used to calculate concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes both the man-made and naturally occurring radionuclides, the total-count log plot, and the Tank Farm gross-gamma log. The Tank Farm gross-gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma log plot to coincide with the SGLS data.